SALMONELLA IN THE NICU

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BEST OUTBREAK – NOV 2015

Introduction

- Hospital A
  - 300 plus bed facility
  - Over 25,000 admissions a year
  - 36 bed specialty level III unit for neonates
- Index patient
  - Date of admission 1/23/2015
    - Premature and diagnosis of sepsis placed in intensive care unit
  - Date of positive *Salmonella* blood culture 1/24/2015
    - Sporadic case and was reported to the local health department of patient's residency.
    - Case investigated by local health department

Initial Response

- February 23, 2015, Regional Epidemiologist (RE) was notified by Infection Preventionist (IP) at Hospital A
  - 2 additional patients in the unit test positive for *Salmonella* (2/20/15)
- Division of Infectious Disease Epidemiology (DIDE) notified of the cluster
- Outbreak investigation was immediately initiated
- Centers for Disease Control and Prevention (CDC)was consulted for further guidance

The Objective of Investigation

- Identify all cases of diarrheal illness
- Characterize risk factors for exposure
- Identify possible source(s) of transmission
- Eliminate or reduce the potential source of transmission
- Prevent further cases

Salmonella

- Healthcare-associated outbreaks
  - Primarily attributed to foodborne sources
    - Breast milk and powered formula
  - Person-person transmission
    - Infected healthcare workers and contaminated fomites
  - Prolonged carriage in infants
  - *Salmonella organisms* can persist in the environment

Methods - Epidemiology

Case definition:

was defined as isolation of *Salmonella* poona from any clinical specimens from NICU patients, staff, or patient's family members between January 15 and March 15, 2015.

- Review of medical records and a line list was completed by the Infection Preventionist.
- Active surveillance conducted for diarrheal illness
  - Questionnaire

Methods - Laboratory

- Clinical specimens
  - Tested at Hospital A
    - PCR then culture
  - Asymptomatic epi-linked infants were tested by PCR
  - Tested at WV Office of Laboratory Services
    - Serotyping
    - Pulsed Field Gel Electrophoresis (PFGE) DNA fingerprinting

Methods – Site Visit

- Visit to Hospital A NICU on March 2, 2015
  - Attendees included staff from DIDE, Regional Epidemiologist, Hospital A Infection Preventionists, Infectious Disease Physician, NICU Medical Director and staff, Director of Quality and Executive Director
  - Walk through of the unit conducted

Results

Epidemiology

- 3 total cases identified
  - No additional diarrheal illness was identified within staff, patients or family members

Demographics

	Mean	Median
Gestational Age	35 weeks	33 weeks
Birth Weight	1.96 kg	1.57 kg
Average hospitalization before positive culture	7 days	4 days

Epidemiology

- Index patient
  - 14 day course of antimicrobial treatment for the *Salmonella* sepsis
    - Transferred to co-inhabited room
  - February 19
    - Developed bloody diarrhea
    - Stool tested positive for *Salmonella*

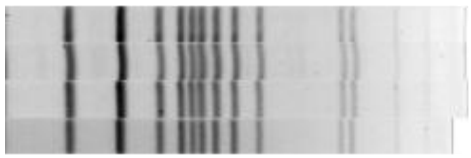
Epidemiology

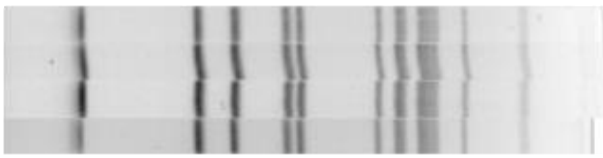
- Second case-patient
  - Roommate of index
    - Developed abdominal distention and diarrhea on Feb 20
    - Tested positive for *Salmonella* in the stool
- Third case-patient
  - Developed diarrhea on February 20
    - Room adjacent to index case
    - Tested positive for *Salmonella* in the stool

Laboratory Results

- Clinical specimens
  - Blood x1 culture (Jan 23)
    - Positive for *Salmonella*
  - Stool
    - 3 *Salmonella* positive results
      - PCR and Culture confirmed
- Serotype
  - WV OLS
  - PFGE patterns for the four isolates were identical by primary and secondary enzyme
  - Identified *Salmonella* Poona

PFGE-BInI





Key	WV PFGE Pattern-XbaI	WV PFGE
M 15000676	JL6X01.wv015	JL6A26.w
M 15000677	JL6X01.wv015	JL6A26.w
M 15000678	JL6X01.wv015	JL6A26.w
M 15000379	JL6X01.wv015	JL6A26.w

Site Visit

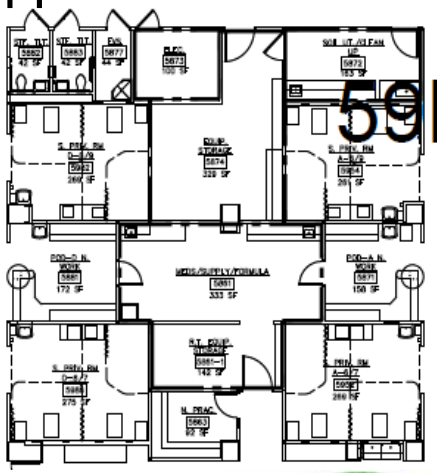
- Staff Interview
  - Diarrhea defined on a case-by-case basis
    - Trigger for testing was defined
- Hand Hygiene and Isolation Precautions Observations
  - Unit specific scrub-in requirements
  - Hand Hygiene observations performed on a monthly basis
  - Isolation performed by IPs randomly
- Communication of positive labs

Site Visit

- Walk Through
  - 36 bed unit divided into 4 pods
    - Each pod has one double occupancy room
  - Each room has only one hand sink
  - Each bed space has its own supply cart
    - Medical and nutritional
  - Diaper scale located on the cart

Site Visit

- Walk Through
  - Babies are weighed with a mobile scale
  - Clean and soiled utility rooms with separate entrance
    - Adjoining door between the two
  - Isolation precautions displayed at each door



Limitations

- Small number of cases
- No observational studies were done by the investigation team
- Staff questionnaire was not reviewed by the investigation team

Conclusions

- Person-to-person outbreak
- February 19 the index case became symptomatic
- February 20, 2015 two additional patients
- Evidence suggests cross contamination

Recommendations

- Hand hygiene
- Increase observational studies
- Environmental cleaning.
- Strengthen communication
- Identify a new location for the diaper scale

Recommendations

- Develop written procedure for clean and soiled utility rooms.
- Place patients on contact isolation
- Discontinue contact isolation
- Discuss appropriate diagnostic work up for obstetric patients diagnosed with chorioamnionitis or history suggestive of pre-partum infections.

Questions ?